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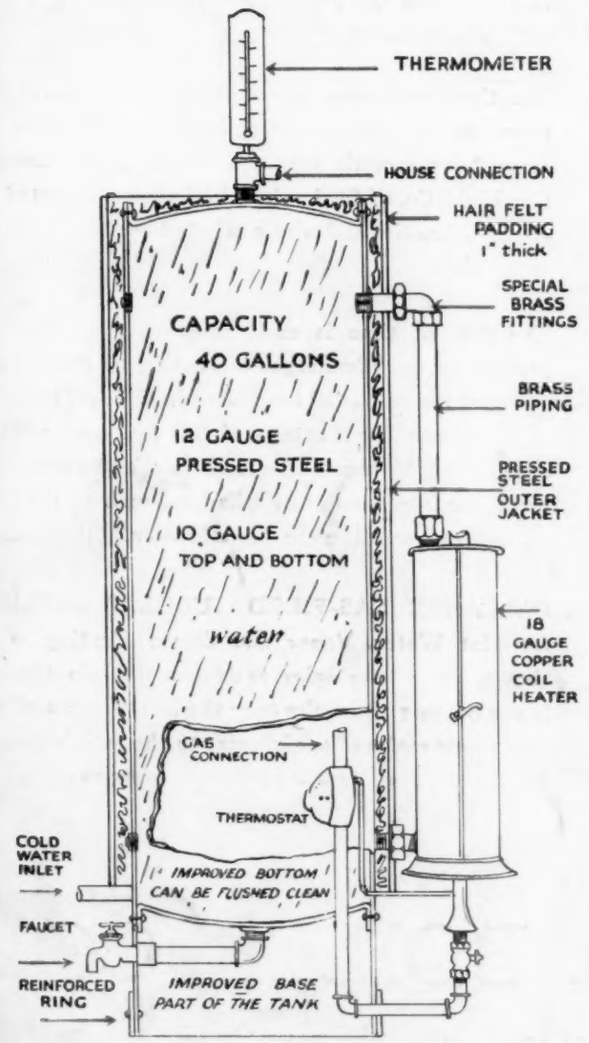

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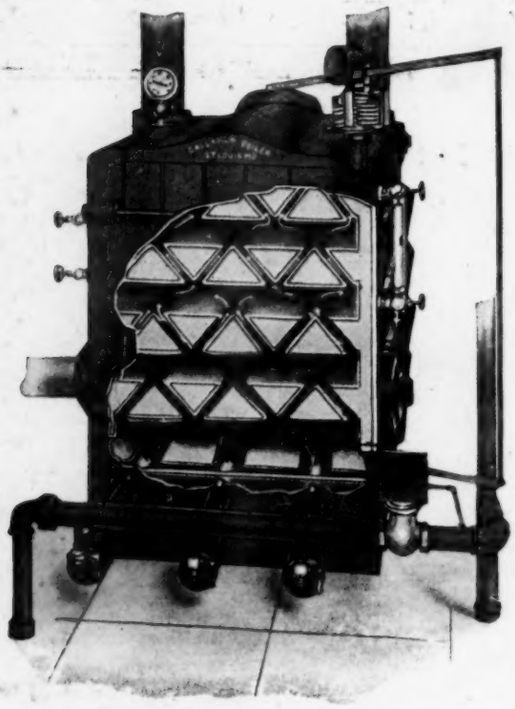

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TO educate the masses to the convenience, cleanliness, economy, wastelessness, safety and all the other virtues of house heating by gas, will take time and patience; but if the start is not made the goal will never be reached.

Yet there are some gas companies who have approached the house-heating-by-gas problem in an earnest, systematic manner; notably, The Laclede Gas Light Co. of St. Louis, who have surmounted all of the difficulties and whose efforts have been entirely successful.

The present time is most propitious for forcibly presenting the advantages of heating by gas, on account of the unsettled conditions in the coal industry with the possible shortage of this fuel next winter, and householders are therefore in a more receptive mood for improved gas appliances, such as the Gallaher Boiler and Storage Tank Heater.

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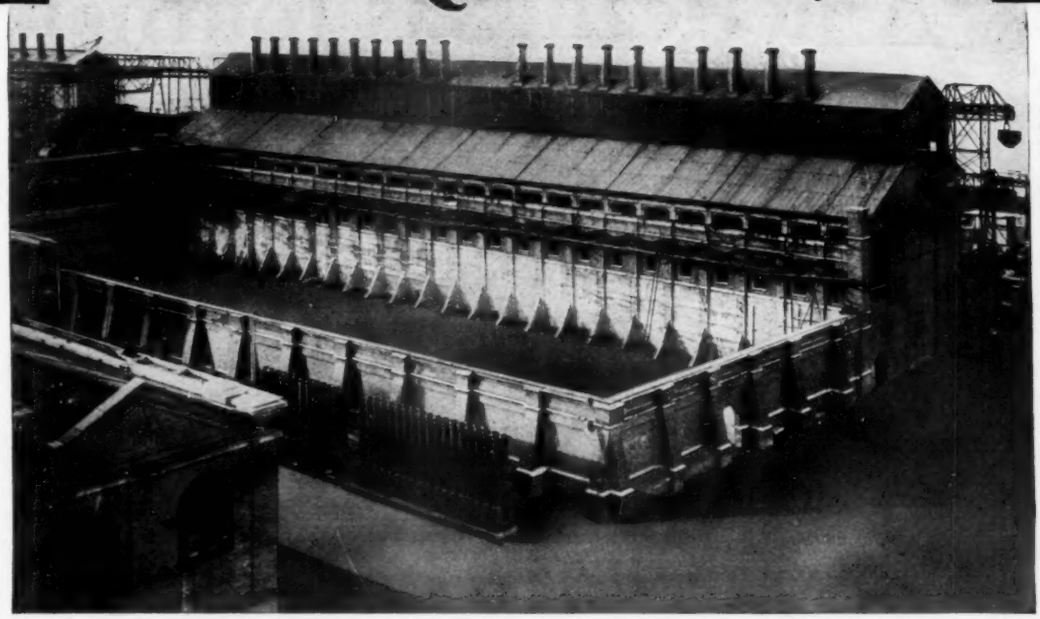

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American Gas Journal

SIXTY FIFTH YEAR

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Gas Boiler Makes Speed of 4,200 Miles an Hour

How gas is used in the manufacture of thread

A contribution from the Industrial Gas Class of the Massachusetts Institute of Technology

E. W. Berchtold

Sales Engineer, Boston Consolidated Gas Company

JUST a short distance from the heart of the city is one of the finest thread mills in the country. The walls and ceilings are snowy white, and not a speck of dirt is to be seen on the floors. It can be readily seen that not a cent was spared when it came to working conditions. Everyone was as busy and happy as could be. It seemed to me as though each employee was putting special effort into his product. I stopped and thought for a moment, and then said to myself, "It all shows up in the finished product." Passing through this room of humming machines, I entered a room at the rear, on the second floor, called the boiler room. Everything was silent. But a silent worker was at work, as you will see from Fig. 1. This was a No. 78 Bryant Automatic Low Pressure Gas Fired Boiler. The part this boiler plays is very important to the thread industry.

Part Played by the Gas Boiler

It turns a soft fibre thread into a smooth, silky finished thread at the rate of 70 miles per minute. The boiler is equipped with a No. 1 automatic water feed, and occupies an approximate floor space of 70 by 30 inches. It supplies steam heat for a finishing room 99 feet long and 17 feet wide and 13 feet high. The inner walls consist of matched sheathing and the outside walls are of 16-inch brick. The roof is flat and tarred. There is a total exposed glass surface equivalent to 306 square feet. The exposure is to the west and southwest. A temperature of 105 deg. F. is maintained day and night.

The Finishing Machines

There are nine finishing machines, as shown in Fig. 2. Under each machine there are 18 rows of one-inch pipe, 3 feet, 10 inches long, with a three-inch header at each end. The length of the headers is five feet each.

The Bryant Boiler supplies steam to these coils at three pounds pressure, the last coil being 130 feet from the boiler, which is located on the floor below. Each machine is connected with a one-inch steam line taken from a two and a half steam main coming direct from the boiler. The returns go back to the

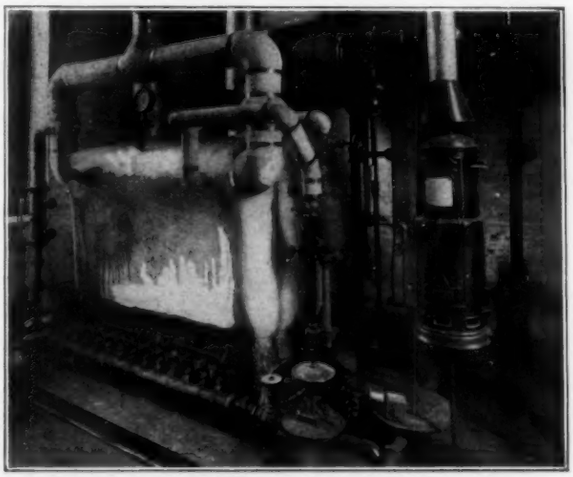


Figure 1. The Gas Heated Boiler

boiler by gravity, the main return being 1½ inches with a ¾-inch connection at each machine. The boiler is covered with 85 per cent magnesia, two inches thick, and all the piping that is not used for heating is covered with standard pipe covering.

How the Thread Is Made

The thread comes from the twisters on spools, in

a rough state, many small fibres projecting from its surface, making it unsalable and useless for sewing machines and other general use. Ninety-eight of these spools are placed on separate spindles at one end of the finishing machine. The thread is then run through a tray of size which can be seen in Fig. 2.

The two large rolls or brushes located in the center of the machine revolve at a rate of 400 revolutions per minute. The thread leaving the size tray passes over the brushes at a speed of 432 feet per

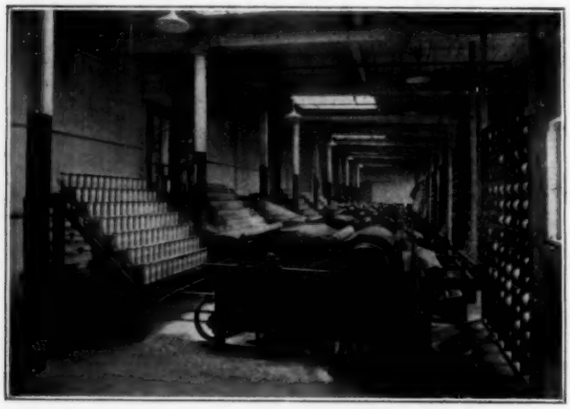


Figure 2. The Finishing Machine

minute. The speed of the brushes being faster than the speed of the thread, the fibres are laid smooth to the surface of the thread and dry almost instantly, giving it a very fine, silky finish. It is then wound up on spools at the opposite end of the machine.

Gas Boiler Furnishes Steam for Steam Coils

The gas boiler furnishes the steam for the steam coils, which in turn give off heat for drying the threads as they travel from the size tray to the spools. In addition to the work mentioned above, four barrels of size are cooked each day. This is accomplished with a one-quarter inch open end steam pipe jetted into the paste barrel. It is for this reason that the automatic water feed is attached to the boiler, there being a loss of water from the boiler by using the steam jet. The boiler requires very little attention and is on the job day and night without watching.

Constant Steam Pressure Maintained

It maintains its own constant steam pressure at all times by means of the automatic fuel control governor. This governor shuts off the gas when the steam pressure reaches three and a half pounds, and turns it on when it has dropped to three pounds. A constant water level is maintained in the boiler by means of the automatic water feed. With these special features, the results are speedy production, uniform quality and perfect finish.

The H. E. Locke Thread Company is one of the largest independent thread concerns in the country and takes great pride in its product as to its strength and running qualities, in which gas plays the important part.

Installation Costs Should Not Figure in Selling Gas

In selling gas the salesman should bear in mind that the installation costs mean nothing to the average intelligent business man; his views are generally directed toward economical production. The operating cost is entirely up to the engineer handling the sale. He should not sell a high pressure boiler when a low pressure boiler will do the work, the efficiency being greater on the low pressure type, which is due largely to construction, as low pressure boilers are constructed of cast iron and in various shapes, according to the manufacturers' ideas of baffling the heat. The high pressure boilers in many states are subject to very strict laws, most of these boilers being constructed of steel, and are of the vertical fire-tube type. The radiation throughout the plant piping is greater on the high pressure steam boiler, therefore the operating cost is increased to some extent, due to the unnecessary heat loss by radiation.

The condensation of steam in bare iron pipe may be determined by taking the difference between the temperature of the steam in the pipe and the external air and multiplying by .00234. This will give you the pounds of steam condensed per square foot of radiation per hour.

Insulation must not be spared at any cost, and all exposed parts and piping not used for production should be covered with heavy insulation. I wonder how many gas engineers insist that steam jacketed kettles be insulated on the outside? The reason I mention this is because it is generally neglected and the radiation from the copper jacketed kettle is very great. A good way to feel about this is that every three square feet of exposed piping not used for production wastes one cubic foot of gas per hour for the consumer. We know we can do it better with gas, and it is up to the engineer to do it cheaper.

ESTIMATED U. S. PRODUCTION OF BITUMINOUS COAL (Net Tons)

Annual production:

	Production	Av'ge per working day
1918 (calendar year)	579,386,000	1,880,000
1919 " "	465,860,000	1,512,000
1920 " "	568,667,000	1,847,000
1921 " "	415,922,000	1,356,000
1922 " "	422,268,000	1,380,000
1923 " "	545,300,000	1,778,000
Weekly production: Christmas week		
1918 (December 22-28)	6,343,000	1,269,000
1919 (December 21-27)	8,755,000	1,751,000
1920 (December 19-25)	9,908,000	1,982,000
1921 (December 26-31)	6,092,000	1,218,000
1922 (December 25-30)	10,171,000	2,034,000
1923 (December 24-29)	6,684,000c	1,337,000

(a) Includes estimate for Dec. 31. Subject to revision. (b) Five-day week. (c) Subject to revision.
*From Department of Interior.

New Year Holds Good Promise

Further Improvement Likely During Spring Season

L. W. Allwyn Schmidt

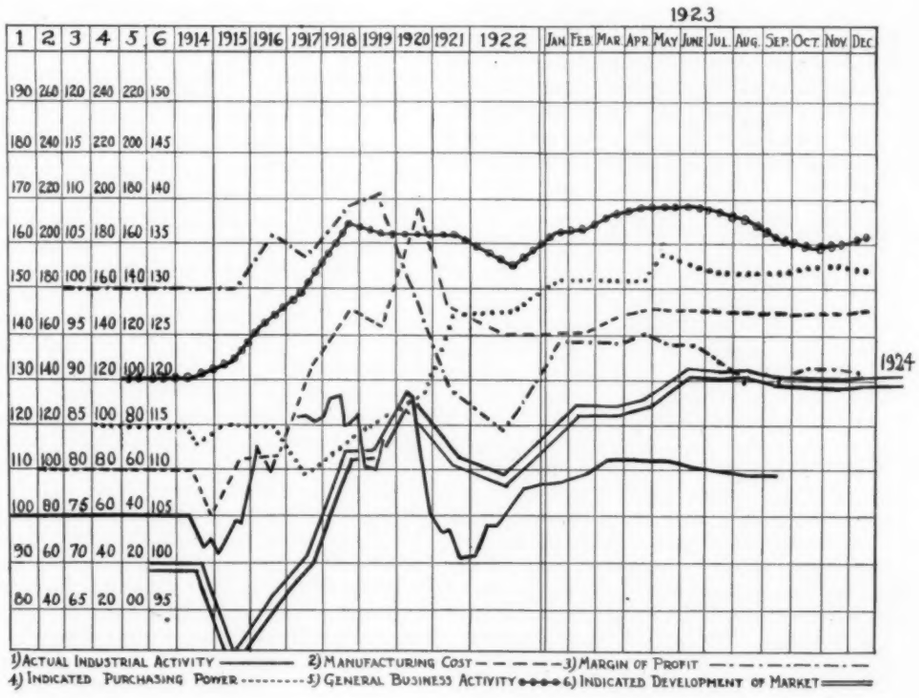
THE year 1923 has gone into history and 1924 has made its bow. This is undoubtedly a good time to look back upon the past year, not so much for the purpose of reviewing its history, but rather to find out how its happenings are likely to influence the course of economic events during the new year.

Those of my readers who have carefully followed the market each month will remember how we voiced increasing optimism early during the year, predicting, however, a flattening out of the economic movement on its top and a slight decline immediately after the highest elevation had been reached. It was, to speak in the headlines of our reports, 'General Outlook Satisfactory" in April, "National Prosperity Increases" in May, "Improvement Continues" in June. In July there appeared the first sign of a slowing down of the upward movement, less rapid progress with "Market Shows Great Steadiness," followed by "Market Retains Favorable Aspect" in August. "Situation Requires Caution" was the keynote of September, with a second warning in October that "Business Moved Upon a Slightly Lower Level." Again we had "Outlook Grows Brighter" in November, the year ending up with advice to the consumer that "This is a Buyers' Market."

These headlines have correctly described from month to month the changing course of business, taking a conservative estimate of each event as it might influence the market and endeavoring to guide the reader through what was one of the most complicated business situations met with for many a year.

Past Year Afforded Good Business Opportunities

Now the New Year has come and it will have to take over the good and bad of last year. It starts with a new promise, but there is still plenty of reason for caution. Nineteen hundred and twenty-three was a year for the man who plays safe and it repaid well the efforts of those able to take care of its opportunities. There was no real danger all along. It did not exist when the cry was raised of inflation early in the year. Nor could it be found in the second half, when many judges of the situation were inclined to take an unnecessarily bleak view of events, which, after all, were only the natural outcome of the somewhat rapid upward movement during the last half of the year 1922.


1923
1 2 3 4 5 6 1914 1915 1916 1917 1918 1919 1920 1921 1922 Jan Feb Mar Apr May June Jul. Aug. Sep. Oct. Nov Dec
1924
1) Actual Industrial Activity
2) Manufacturing Cost
3) Margin of Profit
4) Indicated Purchasing Power
5) General Business Activity
6) Indicated Development of Market

The Effect of the Seasons

The New Year, of course, is only a minor factor in

the market situation. The change of the various seasons is of more importance to business; likewise, the length of each as compared with the others, and the date of the turning point when business begins to be influenced by the demands of the new season.

We entered autumn, 1923, riding upon the crest of an economic wave of great underlying strength, with business running in an even flow of hardly perceptible change in speed and energy. This flow was sustained all through autumn and it still continues even now that winter has arrived.

But winter itself is only a date in the calendar. The winter of the business season is determined, not by the astronomer, but by the weather man. The fall of snow, its quantity, the change of autumn weather to winter weather, with its effect upon transportation, clothing and fuel requirements, and the resulting change of daily habits and customs are the real makers of the winter season. And this year's winter came comparatively late, with snow reported only in isolated cases.

So the early part of the Christmas business was not a "winter" business. Its transactions were affected by other causes. These causes require some investigation. According to all available reports, the Christmas business was good. All retail centers reported good sales and the wholesale trade had large orders for emergency shipments to take care of the new year's business.

Increased Purchasing Power of Nation

Owing to the late appearance of winter weather, this business activity in the retail market has not been influenced by seasonal requirements, but was the outcome, pure and simple, of the increased purchasing power of the nation, pointed out at various times in the course of these articles. While, therefore, this growth in the volume of purchases is itself sufficient proof of the existence of a strong purchasing power, there is additional proof afforded by the increase of savings bank holdings, which are approximately 10 per cent greater than in previous years.

The purchasing force of the nation, indications now lead one to believe, is about to undergo a small decrease, owing to the comparatively low price of certain farm products. It will certainly become fully active only now that the seasonal Christmas business has come to an end. Its strength will depend upon the drain of Christmas purchases upon savings. How much of this Christmas business has been financed from current earnings or how much was withdrawn from savings banks accounts? An answer, of course, can only be had after another month or two. But with the earning power of a large part of the nation being where it is and living expenses remaining comparatively stationary, it can be expected that the purchasing reserve will soon regain its original reserve.

No Violent Changes in Commodity Costs

This will be largely aided by the fact that 1924 is not likely to see violent changes in the cost of the leading commodities. The unavoidable price adjustment, as an outcome of the recent tariff change, apparently came to an end by the middle of 1923. The resulting balance of earning and purchasing power must be very favorable to all business.

The outlook for 1924 is very promising. Developments indicated by the end of 1923 should run a normal course and there is nothing in the present condition of the market heralding a serious disturbance. A new forward movement can be expected with the opening of the spring season in almost all branches of the nation's industry.

HYDROCARBONS FROM WATER GAS

Production of a Synthetic Oil Mixture

In the issue of "The Petroleum Times" for December 1, reference was made to an interesting proposal for the synthesis of hydrocarbons from water gas, due to Fischer and Tropsch, of the Kaiser Wilhelm Institute for Kohlenforschung, at Mulheim. A lengthy account of the process was given in the September issue of "Brenstoff-Chemie," under the title of "Production of a Synthetic Oil Mixture from Carbon Monoxide and Hydrogen." The authors state that the production of oil from coal can take place in two ways; one being the hydrogenation method, and the other by first gasifying the coal, and then treating the gas so as to obtain a liquid petroleum substitute. It is with the latter method that the authors are concerned.

Coal First Distilled at Low Temperature

The initial step is the distillation of the coal at a comparatively low temperature, by which the usual volatile products and a solid residue of semi-coke are obtained. The volatile products are dealt with as in ordinary practice. The second stage is the conversion of the semi-coke into water gas. The gas is then purified, notably from sulphur compounds, and is passed through a tube-like apparatus in which it is subjected to a pressure of 150 atmospheres (about 2,000 lbs. per sq. in.) and a temperature of from 400 degrees to 450 degrees C., in the presence of iron fillings or shavings coated with a contact agent, which may be potassium carbonate. Under these conditions the gas is chemically changed, and, on passing into a cooled receiver, forms a liquid which separates into a watery solution and an oily layer; the proportions being roughly two of the former to one of the latter.

Badische Experiments

Experiments up to this stage, but under somewhat different conditions as to the gas mixture and contact substances, were carried out by the Badische Anilin- und Soda-Fabrik some years ago; and several German patents were taken out covering processes of a similar nature. But the authors state that by following the conditions specified in these patents they get products differing materially from those they have themselves obtained by their own method. The Badische Anilin- und Soda-Fabrik appear to have abandoned their researches, because of the nature of the product, which consisted of saturated and unsaturated hydrocarbons and many other substances, which appeared to render hopeless the possibility of obtaining useful commercial products in an economical manner.

Action of Benzol Wash Oils on Lead*

A. Schneider and E. Jenniger

IN A certain gas works, where benzol was recovered from the gas by absorption in wash oils and where the wash oils, containing benzol, were stored and subjected to further treatment to remove their benzol content, it was reported that the oils appeared to have some effect on the lead packings, and in fact seemed to possess the power of destroying lead. For this reason it was thought advisable to make an investigation of this subject to determine whether or not normal wash oil or its constituents was able to corrode and dissolve lead. The suggestion was made before the experiments were undertaken, that perhaps the corrosion of the metal was caused by the presence of impurities originally existing in the gas and carried along by the wash oil, such impurities as sulphuretted hydrogen, cyanogen and ammonia, especially when the installation in question was located ahead of the dry purifiers. The experimental results, however, clearly showed that fresh wash oil at the boiling temperature has the power to corrode and dissolve lead in appeciable amounts.

Experimental Method

The method used in the determination of the experimental results is briefly as follows: Small lead plates were first very carefully cleansed with alcohol, a number of washings being made; then they were dried and finally weighed. These lead plates were then submerged in the wash oil and various other substances and the contents of the flasks, in which the experiments were carried out, were boiled for a period of 37 hours. The flasks were provided with reflux condensers.

For comparative purposes two series of experiments were carried out, so that each lead plate was subjected to the action of the liquid under consideration at the room temperature and in absence of air for a period of 100 hours, in addition to the experiment described above. After the completion of the experiment, the lead plates were carefully washed free of all adhering oil and then weighed to determine if there was any loss in weight.

Extent of the Investigation

This investigation included the determination of the effect of the following oils on the metal:

1. Fresh benzol wash oil.
2. Wash oil from the operations.
3. Water free anthracene oil.
4. Aqueous phenol solution (solution of 6 grams of phenol in 100 cubic centimeters of water).
5. Alcoholic phenol solution (20 per cent).
6. Pyridine.
7. Solution of naphthalene in xylol (ten grams in 100 cubic centimeters).

Results Obtained

The results obtained from these experiments were as follows:

In the case of fresh wash oil, it was found that the lead plates, which were kept in contact with it, lost approximately 5 per cent of their weight; in the case of the used oil the percentage loss was approximately 1 per cent, while, when the lead plates were subjected to the action of water-free anthracene oil, they lost 2 per cent of their weight.

In the case of the alcoholic phenol solution, the pyridine and neutral oil, it was found that there was no destructive action on the lead plates. On the other hand, the aqueous phenol solution had the effect of decreasing the weight of the lead plates by half of 1 per cent.

Analysis of Wash Oils

The analysis of the fresh benzol wash oil gave the following results:

1. Determination of boiling point:
   To 200 degrees C, 0.5 per cent.
   To 300 degrees C, 88.5 per cent.
2. Water, 0.5 per cent.
3. Solid matter, which was deposited by freezing the fraction boiling between 180 and 250 degrees C and calculated back to the original weight of oil. 2.0 per cent.
4. Content of acid oils. 24.0 per cent.
5. Content of bases. 4.0 per cent.

The Used Wash Oil

The wash oil from the operations, which had been in use for about three weeks before it was employed in these experiments, contained a large amount of sulphuretted hydrogen. The analysis of this oil yielded the following results:

1. Determination of the boiling point:
   To 200 degrees C, 8.5 per cent.
   To 300 degrees C, 71.0 per cent.
2. Water content. 0.2 per cent.
3. Solid matter which is precipitated. 0.0 per cent.
4. Content of acid oils. 5.1 per cent.
5. Content of bases. 3.4 per cent.

Experimental Results

The experimental results show very clearly that lead is attacked most strongly by the fresh wash oil. Furthermore, it is evident that neutral oils, as may be concluded from the experiment in which naphthalene is dissolved in xylol, have scarcely any corroding

*Translated from Das Gas und Wasserbach 1923, page 369.

effect on the lead. From the results of the experiments made with pyridine, it is impossible to derive any definite conclusion without making an additional investigation, at least no such conclusion can be derived as from the results that were obtained in the experiments with aqueous and alcoholic phenol solutions. The reason for this is that there is present, as is well known, a quantity of the homologues of the basic and acid constituents in tar oil, whose combined action gives rise to an essentially different result.

At all times the two experiments with the phenol solutions show that the presence of water, through the increased dissociation that it effects, enhances the acid character of the phenol. It is noteworthy to call attention to the comparatively strong corroding action of water-free anthracene oil, which is not at all expected. It is hardly possible to give an explanation of this phenomenon without going to the trouble of instituting an entire new series of experiments. Then, again, the designation, anthracene oil, applies to an entire series of organic compounds whose properties and characteristics have not as yet been fully investigated.

Effect of Used Wash Oil on Lead

In connection with the effect of used wash oil on the lead, it was naturally expected that this action, in view of the fact that the used wash oil contains in solution many impurities derived from gas, would at the very least be as strong as that of fresh wash oil. That this supposition was not substantiated may perhaps be explained in the following, not taking into consideration the fact that the proportion of acid constituents in the wash oil was materially reduced. It was found at the end of the experiments that the lead plates were covered with a thick film of lead sulphide. This coating apparently protected the lead underneath it from further attack by the wash oil. Because of the strong adherence of the sulphide film to the metallic lead, it was impossible to remove the same without at the same time taking off part of the unchanged lead. The actual loss of lead, caused by the corrosive action of the oil, must for these reasons have been somewhat higher than 1 per cent.

Conclusions

If the results of the experiments, as they are given above, are summarized and compared with each other, the conclusion is reached that it is perfectly safe to say that the "acid oils" that are found in appreciable quantities in the benzol wash oil (these oils are higher homologues of phenol) are in general the main cause of the corrosion of the lead, brought about at a boiling temperature. The fact that anthracene oil attacks lead quite strongly does not in any way contradict this conclusion, as anthracene oil is not a mixture containing neutral hydrocarbons exclusively, but it also contains phenolic bodies of high boiling points. Alpha and beta naphthol are certainly present in the anthracene oil. It is just because the boiling temperatures of the phenols are removed quite a few degrees from one another, and also because phenolic derivatives are to be found in practically every one of the common fractions distilled from the oil, that it was impossible to obtain satisfactory results in the experiments, that were made heretofore to determine the reason why wash oil attacked lead. These experiments were carried out by subjecting the lead to the action of various fractions of the wash oil. It may also be concluded from these experiments that the use of lead packings in benzol installations should be avoided as long as tar oil is used as a wash oil.

SUCCESS SECRETS

Onst there wuz a man who went into bizness for hisself. He sublet half of a large floar space an' the doar Happened to be on his side. Sew won day he took offense at the Landlord an' put a Partition of Temporary character strate threw sew as to Wall Up the other fellow.

This maid the Landlord Wild, an' he went to law an' sed that in his own building that his patrons had to go around threw a Alley an' kum into the back doar. The law maid our Friend put a opening in the Partition an' he Did a lot of talking.

He got his nabors down on him on Both Sides. He quarreled with the male Man an' wrangled with the young Chap who came to reed the electric light meater. He fussed about the quality of everything he bought an' klaimed it wuzn't delivered on Time, or that it wuz wrong somehow.

Whenever a Absent person was spoke of, he would laff or snear or look wise an' Grin. He would never run a kompetitor down but he would shrug his shoulders at the mention of him, look tickled an' say,

"They is things I know about that man an' his methods what would Make mighty interestin' readin', But I ain't sayin' nothin'!"

When he met won of his best friends he would awlways prick up his ears an' Remark sumthing like this:

"I wuz talkin' to Blank this morning an' I give him an ear full. He kant run you down to ME an' get away with it."

This would make Blank Oneasy an' kurious, but our Friend would never say any more.

Little by little the man who went into bizness for hisself lost out. Peppul hadn't Time to listen to his Hot Air. An' he had the fakulty of leaving everybody he talked with, with a Bad Taste in his mouth.

Won day he wanted a loan. He couldn't get it. Another day he wanted a Friend and he couldn't find won. He wuz a widow-man an' he went gunnin' for a wife, but the wimmen awl turned the kold shoulder on him.

He got a letter by the male an' this wuz what the letter sed:

"You Better Take a Tumble to Yourself. A Guy Kant Expect to Reap a Harvest of Friends If He Sews a Krop of Enemies."

GAS MERCHANDISING

Domestic – Industrial

Making Gas Merchandise Sell

The plan of the Peoples Gas Light and Coke Company

W. E. Cecil

We believe that the appliance field offers an excellent opportunity to the sales departments of all gas companies. This is especially so in the house heating and water heating sections, as well as the hotel and restaurant divisions.

Salesmen working out of our water heating and house heating sections are heating engineers, consequently they prescribe the proper equipment and in nearly all cases supervise the installations of all automatic water heaters installed by our company and direct all installations of heating boilers, whether the connections are made by gas company fitters or independent steam fitters. Automatic water heaters and heating boilers are serviced by mechanics working out of this section, thus insuring prompt and efficient service to the customer. This system keeps our customers satisfied and at the same time creates boosters for our merchandise.

Use of Literature

Each year we select a list of 50,000 home owners and mail them attractive and descriptive literature pertaining to automatic water heaters. A postal card is included with the circular and the customer is asked to return the card to us if he is interested in a water heater. A large number of the cards which are retuned result in sales. The mailing of the literature is closely followed up by a water heater salesman. Every address on the list is canvassed and only salesmen thoroughly experienced in water heating are permitted to sell in the districts covered by our mailing list.

We used a list, such as referred to above, in our house heating drive this fall. We followed the same method of working up sales that we followed in the water heater campaign.

Selling Hotel and Restaurant Appliances

In our hotel and restaurant division, salesmen know kilowatt hours as well as B. t. u.'s. They are engineers and well acquainted with the merits of the different fuels and fuel burning hotel appliances. Every hotel and restaurant in this city is classified according to size, kind of fuel and appliances in use. Sales representatives call on these institutions daily. By keeping in such close touch with this class of business, we know the condition of the present equipment and the efficiency of the fuel. With this knowledge at our command, we are able to make many displacements in favor of gas.

Service Section for Architects and Builders

We maintain a service section for architects and builders. This section is equipped with men who have a complete knowledge of the location of gas mains and are familiar with the proper installation of house piping. The representatives of this department obtain information from Dodge Service reports as to buildings that are to be constructed. They call on the builder, architect, or owner, as the case may be, arrange for the gas services and also try to sell them our appliances. If the representative of the Architects and Builders Section is not successful in closing with the prospect, he sends a prospect card to the domestic salesman in the district. In many cases, the domestic salesmen are successful in equipping the entire building with gas appliances. Of course, we have special quantity prices to builders.

We have a force of 45 domestic solicitors working in Chicago. These men call mostly on the domestic gas users. They are required to make a certain number of canvassed calls each day in addition to the calls on prospective customers for which they have received "prospects."

How Employees Are Interested in Obtaining Prospects

A commission is paid to employees who turn in

prospects for the sale of appliances which result in sales. These prospects are turned over to the interested sales division for action. We are constantly striving to keep every employee in the Peoples Gas Light and Coke Company boosting our merchandise sales division, and, therefore, we receive a large number of sales prospects daily from these employees.

Customers who come into our stores and inspect different appliances, but do not purchase at that time, are called on later by the outside men. The salesperson waiting on such customer obtains his name and address and issues a prospect ticket which is distributed to the salesmen in whose territory the customer is living.

Sales Reports

The sales reports from the various outside salesmen are closely supervised. Every "call back" date noted on these reports is carefully checked and placed in a pending file under the date the call is to be executed. If the salesman does not call on that date his sales report will indicate the fact and he is instructed to call immediately and inform his sales supervisor of the result of his visit, also the reason why the engagement had not been kept for the original date.

The above is only a general idea of the operation of our sales divisions, and are in line with the suggestions offered this year in Gas Sales Promotion, a bulletin issued by the Sales Stimulation Committee of the Commercial Section of the American Gas Association.

A NEW PROJECT OF INTEREST TO GAS MEN

The executive board has approved a plan of the Commercial Section for the preparation and issuance of a Monthly Sales Service.

This service will consist of a monthly sales bulletin, eight pages and cover, containing sales plans, publicity and special features applicable to each month of the year. These bulletins will be mailed on the 15th of the month, so that sufficient time will be available to enable the sales manager to locally work out the details for the following month.

There will also be mailed on the first of each month special reports pertaining to subjects of particular interest to the sales manager and his assistants, covering the best practices and plans of gas companies and other successful business enterprises. Some of the subjects to be covered in these special reports are:

Sales Conferences.
Retail Pricing of Appliances.
Intensive Sales Campaigns.
Direct by Mail Advertising.
Newspaper Advertising.
Mailing Lists and How to Use Them.
Window and Store Displays, etc.
Methods of Compensation for Salesmen.
Sales Methods Used in Customer Ownership Campaigns.

Space will be devoted in each of the monthly sales bulletins to giving helpful suggestions for organizing and conducting home service departments.

The physical make-up of the material will be in standard 8½x11 loose leaf form, punched and indexed for filing in a three-ring binder which will be supplied as part of the service.

The subject matter which will make up this service will be prepared by the Sales Stimulation Committee of the Commercial Section, with the aid of a marketing counsellor, James F. Newcomb & Co., marketing and advertising specialists.

This service will provide member companies with practical working plans as regards every phase of special appliance campaigns, advertising features, sales letters, direct advertising, sales contests, window and store displays, and the handling of sales organization.

In view of the comprehensive nature of this service, which will require the expenditure of a considerable sum, it will be necessary, under the approval to the plan given by the executive board, for our member companies to underwrite 1,500 subscriptions at $2.50 a month each before we can proceed.

We plan to begin this sales service with the March issue, but some guarantee that the 1,500 subscriptions will be underwritten before we are authorized to commit the association to the expenditure involved in getting out the service.

CHOOSING A SALES OFFICE LOCATION

A rather unique and unusual method for deciding upon a location for a down-town sales office and show rooms in Atlanta that would be satisfactory to the greatest number of its customers or prospective customers was employed recently by a concern in Atlanta, the idea involved being one that seems particularly adaptable in the merchandising of gas equipment and supplies. That is, of coures, providing that the time arises when a change of location or an additional office is contemplated.

The firm in question sent a blank form to every name on its mailing list, giving a number of available locations for the proposed sales office and show rooms, and asking each recipient to designate which of these locations was preferred. Whereupon the company established the branch at the location that had been selected by the largest number of customers.

At the same time the same idea was employed by the same company to decide which of the three daily newspapers in Atlanta was the best medium to employ for its regular advertising, so far as the desires of its customers and prospcetive customers were concerned. The newspaper receiving the largest number of votes will be the principal one used by the company for its advertising in accordance with the will of its customers.

After all, there is no factor in merchandising of greater value than satisfaction to the greatest number of the firm's customers.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

LESSON No. 3

How heat is produced and the changes effected by it

Expansion of Liquids

When liquids are heated they expand and when they are cooled they contract. The expansion of liquids is taken advantage of in the mercury thermometer and in alcohol thermometer to measure the heat in a body. The mercury in the thermometer column expands as the heat is applied to the bulb and as this expansion is constant for each increase in the heat content of the body, it is possible to determine the relative heat effect produced by the body by the use of a system of temperature scales. This will be explained in more detail later.

Practical Importance of This Heat Effect

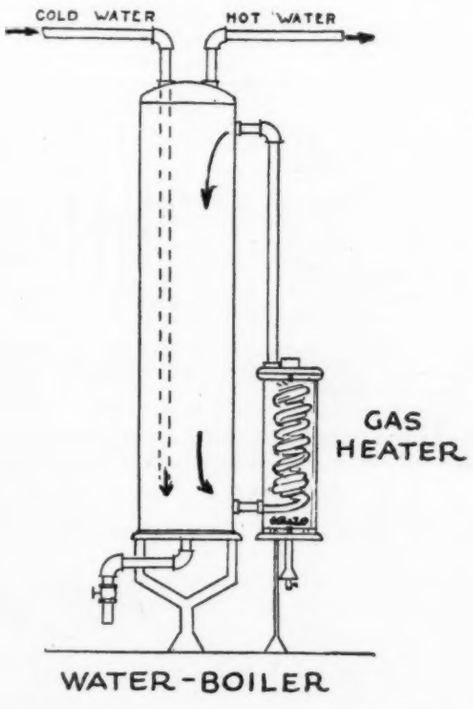
The effect of heat on water is extremely important to the gas engineer. When a body of water, say in a hot water boiler or steam boiler, is heated, the heat is generally applied at one point more than at another. As soon as the layer of water that is closest to the heating surface attains a greater temperature than the rest of the water, it becomes lighter, that is, its specific gravity (weight per unit volume) becomes less, and hence it rises, being replaced by another mass of water of lower temperature, which is then similarly heated. This explains the circulation that is gained in a hot water boiler which is heated by the ordinary coil gas heater. It also explains why the hot water in a hot water boiler rises and circulates through the radiator system.

The behaviour of water as its temperature is raised or lowered is also important from the standpoint of the rapidity of the heating or cooling operation. Thus, as water rises when heated, the quickest way in which to bring a mass of water up to a desired temperature is to heat it at the bottom. On the other hand, when cooling water to freeze it, it will be remembered that after water attains a certain temperature (4 degrees C. or 39.2 degrees F.), it no longer contracts on cooling, as most liquids do, but expands so that the cold water rises to the surface. Thus, in order to cool water most effectively and rapidly, it is necessary to conduct the cooling process from the top surface of the mass of water until a temperature of 39.2 degrees is attained and then from the bottom when ice is to be produced.

As water expands when heated, it is understandable that if it is not given sufficient space within the container to expand, it is liable to burst the same. This explains the use of expansion tanks in a hot water heating system.

Effect of Heat on Gases

Gases expand when they are heated and because their volume is increased they become lighter than



Circulation Is Produced by Hot Water Rising—Hot Water Is Drawn Off from Top, Where Water Is Hottest, and Cold Water Enters at Bottom, Where Water Is Coldest

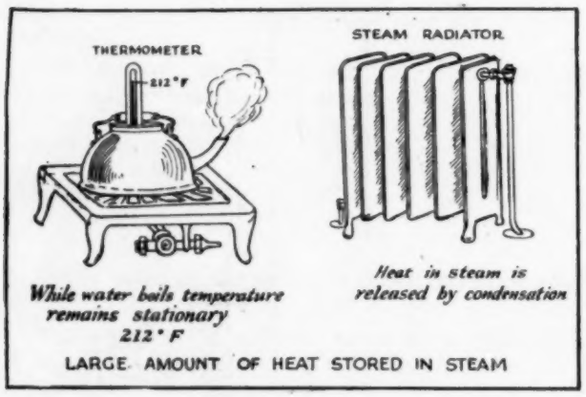
the colder gases or air. This is why the chimney produces a draft. The column of flue gases inside of the chimney is much hotter than the surrounding air and hence the gases rise in the chimney and produce a draft. Furthermore, the ease and rapidity with

which they rise depends on the difference in temperature between the gases and the atmosphere, which also explains the fact that a greater draft is obtained when the temperature differential is greater. The heating of houses by the hot air system is also based on this phenomenon, the hot air rising through the flues and flowing out of the registers.

When gases are heated in a confined space they generate great pressure, due to the restraint that is put upon them from expanding normally. This explains the operation of the gas engine and the great force that is generated in guns when a charge of powder is exploded. The gases produced are under great pressure, due to the high temperature that is produced by the explosion.

Melting of Solids and Boiling of Liquids

It has been mentioned above that the application of heat to solids will cause them to increase in temperature and to expand. When the solid reaches a certain point, peculiar to each, after having absorbed a definite measurable amount of heat, further application of heat does not cause the temperature to rise, but the solid is gradually melted or fused. It is important to remember that this change of state from the solid to the liquid takes place at a constant temperature.


THERMOMETER
212°F
STEAM RADIATOR
While water boils temperature remains stationary 212° F
Heat in steam is released by condensation
LARGE AMOUNT OF HEAT STORED IN STEAM

The experiment of taking the temperature of ice and water mixture may have been tried. It will be noticed that as long as there is still any ice in the water the temperature will not rise, but as soon as all the ice is melted the temperature starts to increase.

Vaporization of Liquids

In the same way the application of heat to a liquid will cause it to expand and to increase in temperature until a point is reached where the temperature no longer increases, but on continued heating the liquid boils and is converted into a vapor. Water in the vapor form contains much more heat than water in the liquid form at the temperature at which this change takes place. This explains the manner in which heat is derived from steam in the steam radiator. The condensation of the steam to water liberates a large quantity of heat, without actually inducing a decrease in the temperature.

A CORRECTION

In last week's lesson a typographical error was made in the fourth and fifth lines of the lesson. The sentence should read: "It is well known that heat will travel from a hotter to a colder body;"

THE EAT MORE WHEAT CAMPAIGN

A Letter from Louis Stotz, Secretary Commercial Section, American Gas Association

To Gas Company Executives:

The National Toast Campaign is a special feature of the co-operative Eat More Wheat movement under the auspices of the Wheat Council of the United States, as described in the attached plan.

There is no particular date set for such a campaign—it may be started at any time, and run indefinitely—a matter for the various interests in each locality to determine and work out the details.

This is an opportunity for the gas companies and we suggest that steps be taken immediately to organize a local committee of the various interests involved and start a co-operative Toast Campaign.

The gas company is particularly fortunate in an undertaking of this character and has the means at hand to perform a worthy service and at the same time secure a direct benefit from its efforts.

Window and Show Room Demonstrations

We suggest that suitable window and show room demonstrations be made of how to make toast the gas way. Tie these demonstrations in with attractive newspaper and other publicity. Tell your public what a good, wholesome, appetizing thing nice golden brown toast is and the many ways in which it may be used. Our February Merchandising Advertising Copy Service will contain some suggested advertisements along this line. Make a special drive on gas toasters and secure the co-operation in their sale of your local grocers, bakers and other dealers.

Offer a certain number of prize toasters to the persons who send in suggestions of the greatest number of uses for toast.

Interest the school children in writing essays on the subject of toast and its uses.

Organize pledge clubs and start a local movement among women's clubs, church societies and other organizations pledging their members to the use of toast for thirty days. At the end of that time they will have acquired the habit and like it.

Many of the large wholesale bakers are carrying full page advertisements in metropolitan papers offering a $5 electric toaster for less than $2. It's all part of this movement.

We suggest that your company tie-in with the plan and advise us what you do.

As The Journal Views It

THE HUMAN FACTOR

In a recent convention of one of the Eastern States gas associations, a dean of the American gas industry, one of the older gas men, delivered a very interesting and entertaining talk depicting the conditions that existed in the gas industry in the days gone by as compared with those that are prevalent today.

In the early days of the gas industry in this country, gas men not only bore ill will toward the public, but toward each other as well. They were bitterly partisan and a coal gas man would refuse to speak to a water gas man. Competition was rife in the industry and everything to make matters more difficult than they actually were seemed to be indulged in. There were no such things as open meetings to which gas men could go and tell of their plans, their doings, the results obtained by certain innovations, etc. In other words, there were none of the aspects of the present status of the gas industry, but rather a deep, underlying feeling of ill will and lack of human consideration for one another.

How different the gas industry is today was admirably brought forth by the speaker. The co-operation that exists between gas companies and gas men in general, the good will one gas man has for another, the friendly spirit of all, the openness with which experiences are exchanged and made public, the attainment of a monopoly in gas fields, are all accomplishments of the present age which to the older gas men are the fulfillment of dreams that appeared impossible of attainment in their day.

But there is one element that remains the same and that is the human element. Today, as in days gone by, the gas industry is still dealing with human beings. They must be taken into consideration in the development of its plans. Employees, it must be remembered, are part and parcel of the gas industry, and the success of a campaign will, under most circumstances, rest directly with them.

Today the gas industry is runniug campaigns on customer ownership, the development of good will, the combating of incorrect information that is disseminated by interested parties, and along various other lines. In all the work that the gas company does to reach the public and deliver to it its message so that the average citizen may know the truth about gas and the ways of the gas companies, it is absolutely essential that the employees take part, for they are the direct contact between the gas company and the public.

The meter reader, the sales clerk, the man who repairs gas appliances that get out of order, the average gas employee can in certain ways do more towards developing public good will, towards disseminating correct information regarding the company he works for than many an executive and official in high office. The employee comes in direct contact with the people who use gas, and by personal conversation he can do a great deal towards combating injurious influences, towards instilling a proper feeling in the consumer for the gas company.

Therefore, it is essential that these employees be considered in every gas campaign. They should be educated to know their value in such work. They should be treated with the proper consideration so that they are encouraged to do their bit in the battle for good will and justice.

It must be remembered that as soon as an employee becomes a mere number in the mind of the executive, his real usefulness in the organization is gone. He must be regarded from the human standpoint, and must be handled in the proper manner so that his usefulness to the company can be developed to the highest degree. By developing him into an efficient employee, by giving him an opportunity to learn all the multifarious details of the gas company, by encouraging him to take an active, leading part in the work of the company to develop public good will, the gas company is not only giving the man or woman a chance to show his or her mettle and gain advancement, but is building up an efficient organization to aid it in its work. The employee then becomes a real factor in the progress of the gas industry and the attainment of the final goal.

GAS WRINKLES

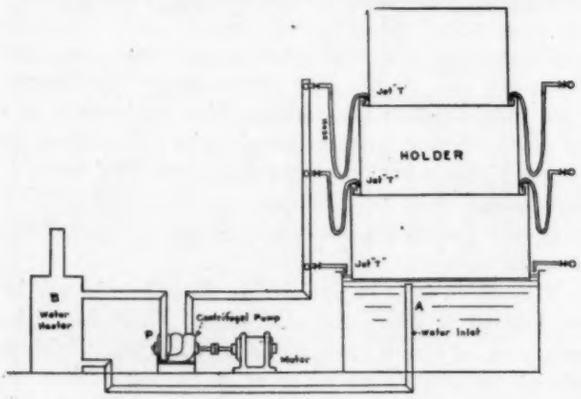
Water Circulation in Gas Holders

C. A. Harrison, Denver, Col.

Method of heating and circulating water in the seal cups of gas holders to prevent the freezing of the water due to complete exposure during severe weather.

The plan described herein and on the accompanying drawing has proven quite successful from both standpoints of efficiency and economy and consists of a forced circulation of water through a water heater and then lifted and forced through jets into the seals.

The installation consists of a motor direct connected to a centrifugal pump "P" with an inlet feed from the water heater "B," the water heater being supplied from the holder at inlet "A." The water is drawn from the water heater, lifted by the pump and forced from the jets into the seal cups, thus causing a continuous movement of water of a high temperature in the seal. As the temperature of the water in



the holder is slightly higher than that of the outside atmospheric temperature and as it is in continuous movement it has not been found necessary to heat the water except in the severest weather.

This method has been successfully operated on a much lower cost basis than the system of heating by steam injected into the cups of the holder through jets. The latent heat in the water in the holder tank is utilized by the circulating system to prevent freezing until the temperature reaches such a low point that it is necessary to add heat by means of the water heater. The economy over the steam jet system lies in three advantages:

1st. The heat stored in the holder tank is utilized

2nd. The water heater is more efficient in itself than a boiler.

3rd—The radiation losses in the circulating piping is less for warm water than for steam.

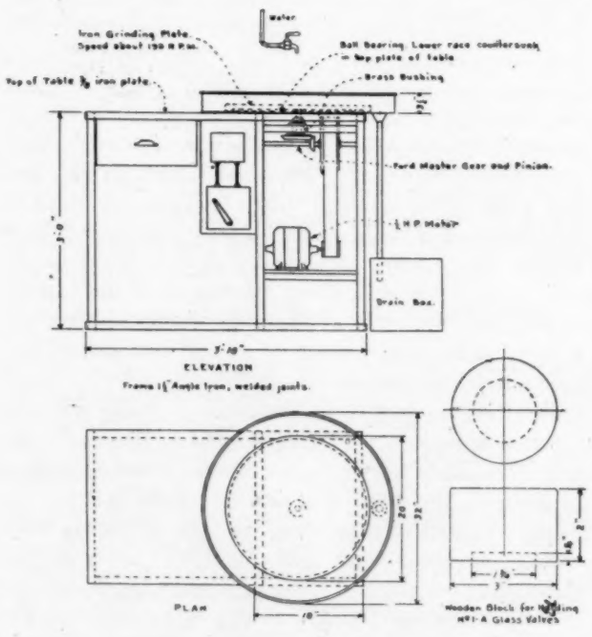
Note: The water is discharged into the cups and tanks at five points in a circular direction, thus imparting a movement to the water. The excess water overflows from the cups to the tank on the inside of the holder.

IRON GRINDING PLATE FOR GRINDING GLASS METER VALVES

D. J. Gray, San Francisco, California

This is a device for grinding glass valves for Sprague meters and all other meter valves. The machine is shown on the accompanying drawing and consists of an iron grinding plate approximately 18 in. in diameter by ⅜ in. thick, mounted on a Ford Master gear meshing with the pinion which is mounted on shaft carrying a pulley wheel. This is driven by ½ H. P. electric motor and the whole equipment is mounted on a 1½ angle iron frame with welded joints. The motor speed is reduced by a belt drive so that the iron grinding plate turns at 130 R. P. M.

The operator sprinkles No. 2 F carborundum powder on an iron plate, which is then moistened to a



muddy condition by water from the faucet shown on the drawing. The glass valve is then placed on the grinding plate, the operator holding same with a wooden block. After about three revolutions of the valve on the grinding plate, the valve is turned out in a perfectly smooth condition, all abrasions being removed. The work is completed in less than a minute's time. The machine is kept running during all of the above operations.

The principal advantages of this machine are increasing production of grinding meter valves from 150 to 600 per day, an increase of 400 per cent. The breakage of the glass meter valves has also been eliminated.

Catechism of Central Station Gas Engineering in the United States

Installment No. 3

(Continued from Last Week)

In the same way broken coal affects about 15 per cent of the fuel bed, while steamboat coal leaves a practically free fire." He also states that steamboat coal presents approximately seven square feet of surface for each cubic foot of generator space; broken coal ten square feet of surface per cubic foot of space, and egg coal twenty-two square feet of surface per cubic foot of space. These figures are for selected coal of the standard size in each case. In practice the steamboat coal will have some broken coal in it, the broken some egg and so on, and the presence of this smaller coal will increase the size of the inactive portion of the fire as well as the amount of surface presented to the air and steam. It is, therefore, important that, no matter what size is being used, the smaller pieces and slack should be screened out and not used in the generator, the coal used being kept as near the selected standard size as possible.

The members of the class should read Mr. Collins' paper, which can be found in the Proceedings of the American Gas Light Association, volume 10, page 82; in the American Gas Light Journal, volume 57, page 690, and in Progressive Age, volume 10, page 399.

Same Data Applies to Coke

What has been said above as to anthracite coal applies also to coke. When oven coke is used, the larger pieces in which it comes from the ovens should be broken up to a size corresponding to broken coal before the coke is charged into the generator. On the other hand, the coke after being broken should be picked up with a fork in such a way as to leave behind the small pieces and dust which should not be used in the generator.

When coke made in coal gas retorts is used it does not require any breaking, but must be picked up with a fork to avoid the presence of small pieces and dust. It must be remembered that a fork can easily be used in such a way as to pick up almost as much fine stuff as a shovel, and that when loading coke which is to be taken to the generator the fork should be well shaken, while the coke is on it, for the purpose of dislodging the dust and small pieces that are held between the larger pieces as they are picked up.

Part 3—Gas Oils

Oils Used for Carburetting Water Gas

21. Name and describe the three grades of oil which are commonly used as the carburetting material in the manufacture of carburetted water gas.

Ans. The three grades of oil which are commonly used for carburetting water gas are crude oil, naphtha and gas oil, the last two being obtained from the first by fractional distillation.

Crude oil is petroleum just as it comes from the oil wells. It is a mixture of liquid hydro-carbons possessing different chemical compositions, specific gravities and boiling points (together with small quantities of other substances) and can be separated into these different substances by fractional distillation. It is found in nearly every country in the world but the most important fields are in the United States, Russia and Peru. The specific gravity of the petroleum obtained in Pennsylvania and Ohio varies from 0.80 to 0.85 (or 45 degrees to 35 degrees Baume) water being 1.00. The color also varies, but is generally dark claret by transmitted light, and greenish by reflected light. The specific gravity of the crude oil found at Beaumont, Texas, is 0.91 to 0.92, or 24 degrees to 22 degrees Baume. It is dark brown in color.

Naphtha and Gas Oil

Naphtha is a general name given to that portion of the products of the fractional distillation of petroleum which comes off after gasoline has been driven off and before the fraction suitable for use as burning or lamp oils begins to come off. It is very volatile at ordinary temperatures and highly inflammable. It is practically colorless, though some samples show a decidedly greenish tinge by reflected light. Its specific gravity varies from 0.68 to 0.74, or 76 degrees to 60 degrees Baume.

Gas oil is a general name given to that portion of the products of the fractional distillation of petroleum which comes off after the lamp oils and before the lubricating oils. It is too heavy and of too high a boiling point to use for lamp oil, but not viscous enough to make a good lubricant, and is chiefly valuable for the production of gas. Its color varies from quite light to very dark. Its specific gravity also varies, but will average about 0.84, or 37 degrees Baume.

Characteristics of Different Petroleums

22. How does the crude petroleum found at Beaumont, Texas, differ in its physical and chemical characteristics from the crude petroleum found in Pennsylvania?

Ans. The crude petroleum found at Beaumont, Texas, differs from Pennsylvania crude petroleum in specific gravity, color, flashing point and viscosity, and also in its ultimate chemical composition, especially as to the amount of sulphur it contains, the percentage of the total volume distilled between various temperature limits when the oil is subjected to

fractional distillation, and the nature of the hydrocarbons of which it is composed.

The specific gravity of Beaumont crude petroleum is from 0.910 to 0.920, that of Pennsylvania petroleum from about 0.78 to 0.88, the average being about 0.83. The color of the former is a dark brown, that of the latter is usually either green or amber, although some samples are brown. The flashing point of Beaumont oil is higher than that of Pennsylvania oil. The former is less fluid than the latter.

According to the following table showing the ultimate chemical composition of samples of both Beaumont and Pennsylvania petroleum, the former contains less carbon and hydrogen, but considerably more sulphur than the latter.

	Beaumont.	Penn.
Carbon	85.03%	86.10%
Hydrogen	12.30%	13.90%
Sulphur	1.75%	0.06%
Oxygen and Nitrogen	0.92%	

The percentage of sulphur given for the Pennsylvania oil is rather smaller than usual, but this oil never contains more than 0.5 per cent of sulphur. In the case of the Beaumont oil it is what may be called fixed sulphur, and in addition the oil, when fresh, contains, in solution, sulphuretted hydrogen, which is largely lost on standing, and can be almost completely eliminated by blowing air through the oil. If this sulphuretted hydrogen is included, the sulphur amounts to slightly more than 2 per cent.

The volume of the fractions distilled off at various temperatures and the temperature at which distillation begins in the two kinds of oil are:

	Beaumont.	Penn.
Distillation begins	230° F.	176° F
Below 302° F	2.5%	21.0%
Between 302° and 575° F	40.0%	41.0%
Between 575° and 662° F	20.0%	14.0%
Between 662° and 752° F	25.0%	23.0%

Beaumont Oil

Very little Beaumont oil distills over at temperatures below 300 deg. F. and it produces no naphtha, but after this temperature is reached the percentages passing over between the same temperature limits up to 752 deg. F. (400 deg. C.) do not differ very materially in the two cases. But while the percentages are very nearly the same the fractions from the Beaumont oil are much heavier than the corresponding ones from the Pennsylvania oil, and up to the present there is no reason to believe that the fraction given off between 302 deg. and 575 deg. F. can be refined so as to be available for use in lamps, and therefore the chief field of usefulness for Beaumont oil will probably be as a fuel oil and a gas oil.

The residues left after the fractional distillation of the two kinds of oil also differ from each other very much. That from Pennsylvania oil contains paraffin scales and is not sticky enough to be pulled out in strings. That from Beaumont oil, although not strictly asphaltic, resembles an asphalt and is plastic. This residue amounts to about 6 per cent by volume of the original oil.

As far as the determination of the nature of the hydrocarbons of which Beaumont oil is composed has gone, it has been shown to contain much larger quantities of unsaturated hydrocarbons and smaller quantities of saturated hydrocarbons or paraffins than the Pennsylvania oil, but the exact composition of these hydrocarbons has not been determined as yet.

Section III—Manufacturing Plant

Construction and Operation

Part 1—Distinctively Coal Gas

Charging, Drawing, and Coke Conveying Machinery

Charging and Drawing Gas Retorts

23. Describe briefly and generally some method of charging and drawing gas retorts, in which hand labor is assisted by mechanical appliances, so arranged as to render the work easier and to enable it to be done by fewer men.

Ans. The appliances most commonly used for this purpose are known as the West Manual Machines. The essential parts are a charging machine, a drawing machine, and a fixed overhead coal bin, from which a coal hopper on the charging machine is filled. There should also be an elevator of some kind to deliver the coal into the overhead bin, and provision must be made for reducing the coal used to a uniform size either by machinery or by hand.

The charging machine consists of a coal hopper and the charging apparatus proper, which are suspended in such a way, from a square upright frame mounted on wheels, that both can be easily raised or lowered together by a chain winch, and fixed at the proper height for charging each tier of retorts. The wheels supporting the frame run on rails laid on the charging floor in front of and parallel to the retort stack, and the whole apparatus can be moved along the stack by means of a hand wheel geared to the wheels of the frame. The hopper is made with the ends, or sides parallel to the stack, vertical, and the other two sides tapering to a long narrow opening at the bottom, through which the coal is fed by a four-bladed feeder, revolving in a feeder box riveted to the under side of the hopper. The charger, a light carriage or box running on three wheels, is supported on a platform just below this feeder box, in such a manner that it is free to move in a direction perpendicular to the face of the stack. Its bottom is formed of a pair of semi-circular scoops, so pivoted and geared that they can be rotated in opposite directions through arcs of 90 degrees, by simply twist-

ing the long driving rod, thus forming an open space through which the coal can drop.

Details of Operation

The operation is as follows: The charging machine is run under the overhead bin, filled with coal enough for all the retorts of the series about to be handled, the charger set at the proper height, and the machine moved into position in front of the first retort to be charged. A hinged flap is dropped, forming a continuation of the charger platform into the mouthpiece. The operator then feeds the proper amount of coal for half a charge into the charger, by turning the feeder, pushes the charger to the back of the retort, twists the driving rod handle so that the scoops on the bottom of the charger rotate, and the coal drops on the bottom of the retort. The charger is then withdrawn, refilled, again pushed into the retort until it strikes the coal already there, emptied and withdrawn, the flap raised, the whole machine moved to the next retort and the lid of the first retort closed. When all the retorts of a series are charged, the machine is moved under the overhead bin and the hopper again filled in readiness for the next charge. A platform attached to the frame enables the operator to work to better advantage when charging the top tier of retorts.

Drawing Machine

The drawing machine is merely a frame on three wheels, which runs on the rails used for the charging machine, carrying an adjustable arm for supporting the rake. This arm is so arranged as not to interfere with the use of the wheelbarrow or coke buggy under the mouthpiece, and is adjusted to the different tiers of retorts by means of a simple hoisting tackle attached to the frame. A platform for use when working the top retorts is fitted to this machine also. The chief object and advantage of the drawing machine is, that it takes the weight of the rake off the stoker, who can thus use a rake with a larger head and work more rapidly.

(For descriptions of other charging devices of the same class, see King's Treatise, Vol. I, pages 285 and 286, Journal of Gas Lighting, etc. (London) Vol. LXXIII, page 181, and Progressive Age, Vol. XV, page 427.)

Charging Retorts by Machinery

24. Describe briefly and generally a system of charging retorts by machinery.

Ans. The Ross Discharging and Charging Machines will be described as an example of such a system.

The discharging machine carriage is made up of I beams mounted on wheels, and is driven with a small engine on rails laid upon the retort floor in front of and parallel to the benches.

On one side of the carriage are mounted an upright boiler, a water tank, feed pump, propelling engine, a horizontal engine, and a water cataract or governor.

Located tansversely across the other side is a rectangular upright frame, the horizontal branches of which are the guides for the reciprocating traveler.

The rake bars can be raised or lowered at will and are guided by grooved rollers, and flat-faced wheels turning on studs to sustain and guide the rake bars, any one of which can be clamped to the traveler or to the rear columns when not in use.

The traveler is a hollow cast iron cross head riding between the guides upon duplicate grooved friction rollers above and below. The successful operation of the machine is due to the ingenious manner in which motion is given to the traveler. The steam cylinder is placed opposite to the water cylinder, both having a common piston rod, and each having a piston attached to the rod, somewhat similar to a steam pump. The two ends of the water cylinder are connected by a pipe with a valve in the center, so that the flow of water can be nicely adjusted. The water in the cylinder forms a cushion alternately at each end, thus preventing any shock or jar to the machine. On the piston rod between the steam and water cylinders is a rack, working a pinion which works a chain wheel on the same shaft, and this chain being attached to the traveler, operates the same, sending it backwards and forwards and carrying the rake to which it is attached with it. The possibility of any shock from the traveler against the end columns of the frame is avoided by rubber buffers, but the working of the machine is so easily controlled that it is seldom that they ever come in contact. The rake beams are of rolled angle iron, and the rake heads are steel castings suited to the shape of the retorts, and hinged to the ends of the rake beams.

The whole of the movements of the machine are governed by levers operated by one man, who is stationed at the extreme rear end out of the way of smoke or steam, and commanding a clear view of the interior of the retorts.

Construction of Charging Machines

The charging machine consists of a rectangular carriage mounted on axles, to which are keyed the flange track-wheels. On one side of the platform are located the vertical boiler, steam reservoir, water tank, feed pump and disc engine for propelling. Upon the opposite side are located the charging hoppers mounted in a vertical frame securely braced and supported upon axles, to which are keyed the wheels running upon rails laid across the platform of main carriage. Between these hoppers and the boiler is a steam cylinder for moving the hoppers back and forth, the motion being accomplished by a reciprocating movement imparted by a rack attachment to piston gearing, and a pinion, to the shaft of which is secured a drum over which a wire rope coils in reverse directions. By the movement of a lever the hoppers are moved foward to the front of benches for the purpose of charging, or backward to the end of traverse rails for the purpose of refilling with coal from the storage bin. At the bottom of each hopper ten ⅜ in. horizontal nozzles are connected, through which the steam is discharged in successive blasts against the coal, projecting it into the retort. The blast pipes are connected with a vertical 3 in. steam stand-pipe which is in turn connected to main steam pipe by a swivel-jointed connection, and a full way

quick-opening valve, the handle of which is located within easy reach of the operator.

The steam reservoir serves as an accumulator to maintain the volume of steam necessary to give a uniform pressure during the operation of charging, and to relieve the boiler from any sudden strain or shock due to the quick opening of the valve. In the practical operation of charging, the machine is moved opposite the retorts previously discharged, the hoppers are filled from the storage bin and moved forward until the conduits enter the mouthpieces of the retorts and stop automatically at the proper point. The operator then projects the coal into the retort by quickly opening and closing the full-way valve three or four times. By the exercise of ordinary intelligence in graduating the duration and force of each blast, he can distribute the charge with as great, if not greater uniformity, than is ordinarily accomplished with scoop or shovel—the actual time occupied in charging three retorts seldom exceeding five seconds.

(For descriptions of other systems of charging retorts by machinery see answer to question No. 25 and American Gas Light Journal, Vol. LXVII, page 1004; Gas Manufacture, Hornby, page 48, and Journal of Gas Lighting, etc. (London) Vol. LXIII, page 957, and Vol. LXVIII, page 314.)

Detailed Description of Machines for Charging Retorts

25. Describe one or more forms of steam, hydraulic, compressed air or electric machines for charging retorts.

Ans. The Bronder machine is one worked by steam. It consists of a carriage or platform mounted on wheels, running on a track laid on the charging floor of the retort house, in front of, and parallel to, the face of the retort stack. This platform carries a steam boiler, a coal hopper, a track at right angles to the main track, upon which run the wheels of a second carriage called the scoop carriage, and two steam engines, one for the purpose of moving the main carriage back and forth along the track on the floor, and the other for moving the scoop carriage, and the scoops attached to it, back and forth in a direction at right angles to the front of the stack.

Motion is communicated to the main carriage by means of an endless screw on the shaft of the engine, and a worm gear on one of the axles of the carriage. The engine is provided with reversing gear and also with a brake on its shaft for the purpose of slowing down and stopping the carriage.

The scoop carriage is driven by a chain or wire rope running around, and driven by, a drum mounted on the main carriage. After winding round the drum, one end of the rope is led to and around a pulley fixed at the front of the main carriage, and then brought back and fastened to the scoop carriage. The other end of the rope is similarly treated, except that the pulley around which it is led is fastened to the back of the main carriage. The drum itself is driven by the corresponding engine through an endless screw and worm gear. The engine is fitted with a reversing gear to which a tappet bar is connected so that the engine is automatically stopped when the scoop carriage reaches the end of its travel in either direction.

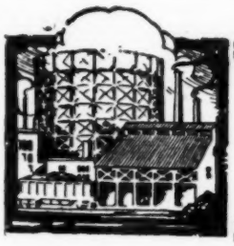
The Scoop Carriage

The scoop carriage is provided with shelves or brackets for supporting the scoops, there being one for each scoop. There are usually three scoops arranged vertically, one over the other, at such a distance apart that each comes opposite the corresponding retort in the setting. Under each of the scoop supports are fixed two rollers, the tops of which protrude through openings in the supports, so that the bottom of the scoop rests upon them. Each scoop consists of a long box, or trough, built of steel and open at the top and front end. Resting loosely in the scoop and on its upper edges is a frame with angle iron sides and cross braces, which carries a series of scrapers. All of these scrapers, except the one nearest the back end of the scoop, are so fastened to the frame by pivots that their lower edges will swing forwards and upwards so as to allow them to pass freely over any coal in the scoop or retort when being drawn backwards, while they strike and rest firmly against the bottom of the scoop when being pushed foward. The rear scraper is rigid and forms the back end of the coal space in the scoop.

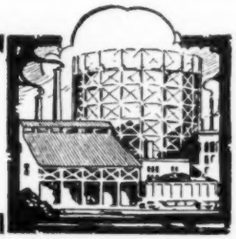
The Scraper Frame

The scraper frame can be moved back and forth relatively to the scoop through a distance a little longer than part of the scoop which contains the charge of coal. As the scoop with the coal is being pushed into the retort, and just before it reaches the limit of its travel, the lower end of a lever pivoted on the side of the scoop near the back strikes a stop fixed on the coal hopper, and is pushed backwards as the scoop moves on. As its fulcrum on the scoop is moving forward the upper end of the lever is given a forward motion, more rapid than that of the scoop, and since it rests against the back of the scraper frame this is pushed forward faster than the scoop, and the scrapers push the coal ahead of them and partly out of the scoop into the seat of the retort, this action taking place just before the scoop stops on reaching the end of its travel. When the scraper frame arrives at its extreme forward position a pawl, pivoted on the main carriage, drops behind the rear crossbars of the frame, and this with the scrapers is thus held stationary, while the scoop is being withdrawn from the retort. By this means the coal is held in place and drops on to the bottom of the retort as the scoop recedes, instead of being drawn backward with it. When the scoop has been entirely withdrawn from the retort, a trip piece on its side strikes an angular tappet piece so pivoted that as its lower end is moved back by the trip piece, its upper end raises the pawl and leaves the scraper frame free to move back. The mechanism which imparts the backward motion to the frame is contained in the back part of the scoop behind the coal space, and consists of a bar, a forward pulley fastened to the scraper frame, a rear pulley fastened to the scoop, and a rope which is fastened at one end to the rear of the scoop, passes forward around the pulley on the frame, back around the pulley fixed to the scoop and forward to have the other end fastened to the bar.

(Fourth Installment Next Week)



NEWS OF THE GAS INDUSTRY



Report of Third Annual Gas Meter Short Course

Ames, Iowa—December 4 to 7th, inclusive, 1923

The Third Annual Gas Meter Short Course, conducted by the Engineering Extension Department of the Iowa State College and the Iowa District Gas Association, has recently been held at the State College at Ames. Eighty-seven men from ten different states registered and a large percentage of them attended all the sessions of the course.

The large increase in attendance over that of the two previous courses and the number of men of national prominence in gas meter affairs who attended are ample testimony to the widespread interest that has developed in these gas meter short courses. The enthusiasm of these men over the manner in which the course was conducted and over its practical value to those attending and to the gas industry, is sufficient evidence that the training of gas men by means of courses of this nature is of great value and shows its great possibilities as a means of educating gas men in all branches of the industry.

It seems probable that this method of instructing gas company employees, which had its inception at Ames only two years ago, will spread rapidly and develop into a position of national importance in the gas industry. Similar courses are already under consideration in the states of Illinois, New York, Virginia and North Carolina.

No attempt was made to limit the various discussions to the periods assigned to them on the program, and certain rearrangements of the program were found necessary because the discussions of certain subjects occupied much more time than had been assigned them. It was the general opinion of the men who had attended all three courses that the discussions and papers at this course were far better than those of either of the first two courses. Many odd local practices in meter shops in the small companies cropped out in the course of the various discussions and methods used in the different larger meter shops compared and discussed, and it is believed that we accomplished a lot in eliminating bad meter shop practice and standardizing our meter shop methods. The active participation in the discussions by the representatives of the various meter companies with others of long and varied experience with gas meter practice was a big factor in making the discussions so helpful to the men from the smaller gas companies.

One important change in the method of conducting the prover and repair bench work was the assigning of certain experienced prover and repair men to act as instructors during all of the shop work periods. A definite program of instruction was laid out for each type of meter and to suit the requirements of each group of men. At the first two courses, volunteer instructors were called for from the experienced men attending and the instructors were changed around to enable them all to take in part of the discussions. The result of this was a certain amount of

confusion and a somewhat haphazard system of instruction. By assigning men to devote their entire time during all shop work periods to instructing, and planning their work in advance, the confusion experienced during the first two courses was largely eliminated and much more thorough instruction given. The instruction staff was as follows:

Mr. Geo. A. Lane, superintendent of meters, Peoples Gas Light & Coke Co., in charge of all instruction.

Mr. A. T. Barrett, American Meter Co., Chicago, Ill., in charge of tin case meter instruction.

Mr. E. C. Falvey, Sprague Meter Co., Davenport, Iowa, in charge of Sprague meter instruction.

Mr. Larmour Adams, Metric Meter Co., Erie, Pa., in charge of Metric meter instruction.

Instruction in proving: Frank Kepschull, prover room foreman, American Meter Co., Chicago, Ill.; E. Wertham, meter shop foreman, Peoples Light Co., Davenport, Ia.

Instruction in tin case, bench work, repairs: Michael Quinn, Des Moines Gas Co., Des Moines, Ia.; Wm. Rosenia, meter shop inspector, Peoples Gas Light & Coke Co., Chicago; Harry Wilkerson, meter shop foreman, Des Moines Gas Co., Des Moines, Ia.; Verne Coffland, meter repairman, and Harold McLaughlin, meter repairman, Des Moines Gas Co., Des Moines, Ia.

Instructors in Sprague meter repairing: E. C. Falvey, Sprague Meter Co., Davenport, Ia.; E. Wertham, meter shop foreman, Peoples Light Co., Davenport, Ia.

Instructors in Metric meter repairing: Larmour Adams, factory superintendent, Metric Meter Co., Erie, Pa.; Louis Carrier, assistant superintendent, Metric Meter Co., Erie, Pa.

The prover and repair bench facilities were adeqquate to give all necessary instruction and together with the capable instruction staff made this part of the program thoroughly satisfactory.

The banquet held in the large dining room of the Sheldon Munn Hotel was attended by nearly all the men registering at the course, as well as by the members of the Council of the Iowa District Gas Association. Mr. J. H. Ainsworth, manager of the Public Service Co., Ames, Iowa, had charge of the affair and put it over in fine shape. An excellent menu, music by the State College Quartet and singing by the "bunch" were followed by speeches by members of the Council and by members of the Short Course Committee and prominent gas men attending the course. Mr. Sterrett, secretary of the Iowa District Gas Association, was toastmaster, and in this capacity he contributed largely toward making the banquet a very enjoyable affair.

George H. Waring Opens Office

George H. Waring announces the opening of an office in the Powers Theatre building, Grand Rapids, Mich. Mr. Waring was with the United Gas Improvement Co. for over 25 years, and more recently was vice-president of the American Public Utilities Co. He announces that his service now will cover expert advice in connection with the design, construction, operation, financing and valuation of public utilities. Mr. Waring is a member of the American Society of Mechanical Engineers and also of the American Gas Association.

New Machinery Installed in Helena

Helena—The Arkansas Utilities Company, which several months ago succeeded the Helena Gas & Electric Company, has recently installed several thousand dollars worth of new machinery. New lines are being constructed to various sections of the city, and the company is serving power, heat and light to the Delta Cotton Mill, which, with the exception of a mill at Monticello, is the only cotton mill in Arkansas. The Arkansas Utilities Company owns electric, gas and ice properties at Helena, and has recently issued and sold $200,000 in bonds for additions, improvements and betterments of the company's plants at Helena, West Helena, Brinkley, Kingsland, Clarendon, Rison, Fordyce and Cotton Plant.

W. A. Robinson Takes Charge of El Dorado Interests

El Dorado—W. A. Robinson, vice-president of the Central States Gas & Electric Company, which recently took over the properties of the El Dorado Gas Company, will be in charge of El Dorado interests of the company. The Central States Gas & Electric Company is capitalized at $2,500,000, and the El Dorado Company is the fourth gas company to be taken over by this concern. W. A. Bush of St. Louis is president of the new organization.

Refund Checks Mailed to Consumers

Pine Bluff — Refund checks amounting to more than $15,000 were recently mailed to gas consumers at Pine Bluffs and Sheridan, following an agreement between the consumers and the Arkansas Natural Gas Company, on rates. Several thousand consumers had been paying for gas at an increased rate over the old schedule. The gas company had agreed to refund amounts collected over the rate finally agreed upon. The compromise was effected and the refund checks were mailed out as New Year presents.

LEMON PARKER, PRES. PARKER-RUSSELL MINING & MFG. CO., DIES

Was Member of Minority in House of Delegates at Time of Famous Boodle Exposure

Lemon Parker, 67 years old, president of the Parker-Russell Mining and Manufacturing Company, 3314 Morganford road, St. Louis, Mo., died of heart disease January 11, at his home, 3413 Oak Hill avenue. He had been ill two years and had not been active in business for some time.

Parker was a son of the late George W. Parker, a pioneer St. Louisan. In 1895 he married Emily C. Macdonald, who survives him, as do two sons, George M. Parker, who is connected with the Parker-Russell Company, and Harry L., a student at Wisconsin Universty.

Parker, a Republcan, represented the Twenty-fourth Ward in the House of Delegates in 1899 to 1901. He was a member of the minority in that House when certain members of the majority were involved in the famous boodle expose.

Gas Company Employees Get Good Advice

Quincy, Mass.—Edward J. Cooney, service and sales manager of the Lowell Gas Light Company, was the guest at the monthly meeting of the Quincy Gas Association, an organization composed of employees of the Citizens Gas Light Company, in Electa Hall, and gave an interesting and instructive talk on "Public Relations of the Public Utilities."

Mr. Cooney emphasized to employees the importance of giving prompt and courteous attention to customers who feel they have a grievance against the company, regardless of how small the complaint may be. He also laid stress on courteous and prompt telephone service.

President Nichols, of the company, also spoke a few words, dwelling on the fact that employees of a public utility are working for the public rather than any official.

The association had for its guests the employees of the Old Colony Gas Company of Braintree and the Dedham and Hyde Park Gas Company. After the main business was disposed of, dancing was in order, music being furnished by Ted Johnson's Syncopators, Ted being one of the popular employees of the company. Refreshments were served. The Misses Hartrey of the Old Colony Company gave several vocal selections and were heartily applauded. The meeting was under the direction of Vice-President John J. Quinn.

Assumes Position as Gas Supt.

H. P. Geisler has arrived in Baton Rouge to assume the position as gas superintendent for the Baton Rouge Electric Company. For the past three years Mr. Geisler has been gas engineer for the Puget Sound Power & Light Company at Bellingham, Wash., and comes to Baton Rouge from that position.

Mr. Geisler received his training as an electrical engineer at the Massachusetts Institute of Technology in Cambridge, Mass., entering the Stone & Webster organization in 1917 as a student engineer in the Boston office. He has had responsible positions in the gas department at Paducah, Ky., New London, Conn., and Bellingham, Wash., and has also done a large amount of examination work on various gas properties throughout the Northwest.

Columbia Gas & Electric Company Issues Monthly Magazine

"Hail Columbia," a new magazine, published by the Columbia Gas and Electric Company, described as "a monthly publication through whose pages the employees and friends of the Columbia Gas and Electric Company may obtain a broad view of its aims and accomplishments and become better acquainted with the underlying principles on which the company was founded," has published its first number, dated January, 1924.

The opening issue contains a foreword by P. G. Gossler, president of the company, announcing the inception by Columbia of a customer-ownership policy.

"We are going," says Mr. Gossler, "to invite our customers also to become our partners in the Columbia; we are going to give every one who looks to us for light and heat and power an opportunity to become a stockholder with us.

"We are inviting these thousands of friends and customers of ours to associate themselves with us, on the strength of our record in the past; but we cannot honorably do so without resolving, each for his own part, that he will make that record even finer in the future."

The magazine also contains an interesting article by S. B. Williams, editor of the Electrical Record, on "Public Utility Opportunity," and a map, entitled "The Land of Columbia," showing the territory served by the Columbia operating companies.

W. E. Davidson Appointed General Manager

Waycross, Ga.—Day & Zimmerman, who recently purchased the properties of the Ware County Light & Power Company, of Waycross, Ga., operating the public utilities in that city, announce the appointment of W. E. Davidson, of Albany, Ga., as general manager of the company. He succeeds P. R. Bomeisler, who resigned recently. Mr. Davidson has been identified with public utilities in Georgia for a number of years and is well known to the industry.

Gas Sales Association of New England Hold First Meeting of New Year

Over two hundred members and guests were present at the first Gas Sales Association meeting of the new year, held on Friday, January 11, 1924, in Boston, Mass.

Governor Woodhead, of the association, thanked the members of the association for their co-operation in the past year and hoped that the coming year would be as successful as the year just past.

Mr. Kurwin Boyes, of the American Gas Association, brought greetings from Major Alexander Forward, the new secretary-manager of the American Gas Association.

Mr. Boyes outlined the various activities of the different sections of the American Gas Association. He said, in part:

"The executive board of the American Gas Association has applied for the issuance of a monthly sales service. In order to publish this service it is necessary to have fifteen hundred subscriptions at $2.50 per month. This service will assist in setting up definite sales plans for each month with an aim to increase the appliance sales over 50 per cent within the next three years. The association will make no profit. The entire preparation of the material will be handled by a firm of counsellors.

'The response from member companies for this service is most gratifying. Over one hundred companies have already subscribed.

"The commercial section has also a window display club member-

ship. This is open at no cost to members of the A. G. A. Monthly prizes will be awarded for the best window display ideas and these ideas will be passed along to the association membership."

The next speaker of the evening was Mr. Samuel T. MacQuarrie, who has recently been appointed director of the New England Bureau of Public Service Information. Mr. MacQuarrie said in part:

"The purpose of the New England Bureou of Public Service information is to collect news items from the public utility companies and distribute the same to newspapers and magazines throughout the country.

"As a group the gas industry keeps a little bit too mlch information to themselves. We find that the telephone company has a good publicity department and the things they put out are reliable. The electric industry is pretty well advertised.

"Itisamistaketothinkthepublicisn

"It is a mistake to think the public is not interested in what you gas men are doing. We have great difficulty in obtaining items from the gas industry that can be published.

"The gas figures show that the year 1923 is bigger by twenty-five billion feet of gas sold than in the year 1922.

"In an industry with six billions of dollars invested there must be a great many things of interest to the public. Your duty is to pass these articles along to the American Gas Association, and they will, in turn, distribute this information to us, and we can help you."

Mr. Clifford E. Paige, president of the New England Association of Gas Engineers, was the next speaker.

He referred to the Industrial Gas Class at the Massachusetts Institute of Technology and how the various companies in New England sent representatives to this class in order to learn more about the uses of gas for industrial purposes.

Mr. Paige stated that he was much impressed to see the growth of the Gas Sales Association.

Mr. Paige referred to the coming convention of the Gas Engineers and the number of requests the Gas Engineers have had from people who would like to present their information at this convention. This shows how rapidly the gas industry is growing.

Reference was made to the toast campaign now being conducted by the bakers. The members of the association were urged to get behind this movement. It is important to have your window carry the idea of "Toast." If possible, have some action in the window.

The Lowell Gas Light Company will have a young lady in the window making toast with gas and these samples will be distributed to every one who comes into the store. Various ways were suggested to increase the consumption of gas through this toast campaign. One company is to give away a small gas toaster for twenty-five bread wrappers, another company will give a substantial discount on gas toasters purchased during this campaign.

The subject for discussion at the meeting was Industrial Gas. The board of managers of the association was instructed to find the best authority possible to address the Gas Sales Association on this important matter of the uses of Industrial Gas. With this thought in view, Mr. Henry O. Loebell, vice-president and general manager of the Combustion Utilities Company of New York, was selected as the speaker.

Standard Gas and Electric Co. Reports Preliminary Earnings for 1923

H. M. Byllesby & Company has announced the preliminary earnings figures for Standard Gas & Electric Company for the year 1923. Compared with 1922, the best previous year in the company's history, net revenue shows an increase of $451,299. The amount earned on the common stock was over $7.75 a share on the 212,000 shares of non-par value stock outstanding.

It is stated that the board of directors is expected to increase the present dividend rate of $2.50 a share paid on the common stock, and that it is expected application will be made in the near future to list the common stock on the New York Stock Exchange. Both preferred and common stocks are now listed and actively traded in on the Chicago Stock Exchange.

Comparative earnings for the twelve months ended December 31 are given as follows:

Gross	1923	1922
Revenue	$5,196,930	$4,759,702
Expenses and Taxes	93,505	107,576
Net Revenue	$5,103,425	$4,652,126

The earnings of operated utility companies for the twelve months ended November 30, 1923, and the twelve months ended December 31, 1922, are reported as follows:

	Gross	Net
*1923	$45,849,497	$18,466,869
1922	42,038,742	16,056,229
Increase	$ 3,810,755	$ 2,410,640

Significant figures showing the growth of the operated companies during the past year are reflected in a gain of 155 communities supplied with service, 350,000 increase in population of the total territory served, a gain of 102,284 customers and an increase of 181,527 in installed hydro and steam electric capacity. The properties now have upwards of 50,000 home or local shareholders.

New financing by Standard Gas and Electric Company to retire 7 per cent and 7½ per cent bonds and notes and to provide capital for additional investments, will be brought out this week.

Plans Extension and Development of Plant

Atlanta, Ga.—The Georgia Railway & Power Company of Atlanta, operating the city's public utilities, including the Atlanta Gas Light Company, has announced plans for an investment of more than $6,500,000 during the present year for the further extension and development of its properties throughout the state, including hydro-electric developments in North Georgia. Of the above amount the company is planning to spend more than $3,000,000 for improvements and extensions to the properties of the Atlanta Gas Light Company and the electrical and other departments.

*12 months ended November 30.